NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

November 5, 2013

Group Chairman's Factual Report

AIR TRAFFIC CONTROL

ANC13FA030

A. ACCIDENT

Location:	Aleknagik, Alaska
Date:	March 8, 2013
Time:	0812 Alaska standard time[1] 1712 Coordinated Universal Time[2]
Airplane:	N116AX, a Raytheon-Beech 1900C, operating as Alaska Central Express flight 51, "AER51."

[1] All times are Alaska standard time (AST) based on a 24-hour clock, unless otherwise noted.
[2] UTC – Coordinated Universal Time – an international time standard using four digits of a 24-hour clock in hours and minutes based on the time in Greenwich, England.

B. AIR TRAFFIC CONTROL GROUP

Mr. Scott Dunham
National Transportation Safety Board
Washington, DC

Mr. Bryan Roberts
National Air Traffic Controllers Association
Fort Worth, Texas

Mr. Clifton Jordan
Federal Aviation Administration
Washington, DC

Mr. Patrick Keane
National Air Traffic Controllers Association
San Diego, California

C. SUMMARY

On March 8, 2013, about 0812 Alaska standard time, a twin-engine turboprop Beech 1900C airplane, N116AX, was destroyed when it struck rising terrain about 10 miles east of Aleknagik, Alaska. The airplane was operated under the provisions of 14 Code of Federal Regulations (CFR) Part 135 as Alaska Central Express flight 51, an on-demand cargo flight. The airline transport certificated captain and the commercial certificated first officer sustained fatal injuries. Instrument meteorological conditions were reported in the area at the time of the accident, and the airplane was operating on an instrument flight rules (IFR) flight plan. The flight had originally departed Anchorage about 0544 and made a scheduled stop at King Salmon, Alaska (PAKN) before continuing on to the next scheduled stop, Dillingham, Alaska (PADL).

According to controllers at the Anchorage Air Route Traffic Control Center (ZAN), the flight crew requested the RNAV GPS 19 instrument approach to the Dillingham Airport. The ZAN controller cleared the pilot to proceed direct to Zedag, the initial approach fix, to begin the approach, and to maintain at or above 2,000 feet until established on a published segment of the approach. A short time later the flight crew requested to hold at Zedag so that they could contact the flight service station (FSS) for a runway condition report, and the controller approved the request. The controller then lost radar contact with the aircraft and made several unsuccessful attempts to contact the crew. There were no further communications with the aircraft, and the wreckage was discovered several hours later.

D. DETAILS OF THE INVESTIGATION

The air traffic control group convened on March 20, 2013, at ZAN to obtain a facility briefing on the accident, review training materials and other local documentation, observe the radar position handling the aircraft, and interview the operations manager, supervisor, and controllers on duty at the time of the accident. The group completed work at the facility on March 22 and departed after briefing the management staff on the group's findings.

1.0 History of Flight

AER51 first contacted the ZAN sector 13 radar controller (R13) at 0750:43 on the ground at the King Salmon airport, requesting an instrument flight rules clearance to Dillingham, Alaska. The R13 controller cleared the flight to Dillingham as filed, and instructed the pilot to maintain 6,000 feet. The flight was issued transponder code 4251. The pilot read the clearance back correctly.

At 0755:30, AER51 contacted the R13 controller, reporting that they had departed from PAKN and were climbing through 3,500 feet to 6,000 feet. The controller acknowledged the report, and at 0757:18 advised the pilot of radar contact three miles west of the King Salmon VOR. The controller asked the pilot to confirm his altitude. The pilot concurred with the position report, and stated that his altitude was 5,800 feet. The controller asked the pilot to report ready for descent and to choose which approach he wanted to fly. He acknowledged both requests.

At 0758:13, a position relief briefing began at the sector, and the original radar controller was replaced by another radar controller.

At 0802:01, the radar controller asked the pilot of AER51 which approach he was requesting at PADL. The pilot replied that he was obtaining the Automatic Terminal Information Service (ATIS) broadcast and would, "…let you know here in just a second."

At 0803:33, the pilot transmitted, "AER51 current weather down in to Dillingham requesting RNAV one nine approach, any chance we can get direct Zedag?" The controller replied, "AER51 cleared to the Dillingham airport via direct Zedag, Zedag transition maintain well maintain at or above two thousand until established on a published segment of the approach, cleared RNAV runway one niner approach Dillingham airport, remain this frequency." At 0804:04, the pilot read back, "We'll stay with you, cleared to Zedag transition for the RNAV one nine approach into Dillingham, maintain two thousand until a published segment of the approach AER51."

The R13 controller called Dillingham Flight Service Station (FSS) while the pilot was reading back the clearance. At 0804:19, the FSS specialist answered the call, and the R13 controller passed coordination information regarding the flight's arrival to PADL. The call terminated at 0804:36.

At 0809:31, AER51 transmitted, "… AER51 ah approaching Zedag, we'd like to hold waiting for (unintelligible) more information if possible." The controller asked the pilot to repeat the transmission, and the pilot replied, "AER51 requesting hold at Zedag for runway conditions." At 0809:43, the R13 controller cleared the pilot to, "…hold north of Zedag as published, expect further clearance 1800 upon your request." The pilot read back, "…hold north of Zedag expect further clearance 1800 (unintelligible) runway conditions, thanks." The controller acknowledged the readback with no additional comment.

At 0814:28, the Dillingham FSS specialist called R13 and reported that he had been trying to contact AER51 with the requested runway condition information without success. The R13 controller agreed to try to contact AER51 to relay the runway conditions. At 0814:50, the R13

controller began several unsuccessful attempts to contact AER51 both directly and by relay through other aircraft. There were no further contacts with AER51.

2.0 Radar Data

Radar data for this accident was obtained from the FPS-117 radar site located near King Salmon, Alaska, about 60 miles southeast of the accident site. Radar contact with the flight was lost at 0810 as the aircraft passed ZEDAG to enter the holding pattern there. The flight's last reported altitude was 2,000 feet above sea level.

According to archived METAR information for PADL, the altimeter setting at the time of the accident was substantially lower than standard:

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2013-03-08 18:45 METAR PADL 081845Z 10014G23KT 2SM -RASN OVC006 01/00 A2916 =
2013-03-08 16:45 METAR PADL 081645Z 10017G30KT 7SM -RA OVC015 01/01 A2909 =
2013-03-08 16:36 METAR PADL 081636Z 10022G28KT 10SM 01/01 A2909 =
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Altitude reports from aircraft are all referenced to standard sea level pressure, 29.92 inches of mercury. The 1645 barometric pressure reported at PADL was 29.09 inches of mercury, requiring that AER51's altitude reports be reduced 800 feet to approximate true altitude. All altitude references in this report have been corrected accordingly.

Review of recorded radar data showed that the aircraft's flight path caused a minimum safe altitude warning (MSAW) alert to the controller beginning with a one-second aural alarm at 0809:16 and a flashing "MSAW" indication in the aircraft's data block that continued from 0809:16 until the track was dropped at 1045:44.

Minimum Safe Altitude Warning Messages for AER51 (times UTC)

MV: 03/08/13	ACID-ACDF	C	X	Y	X-VIO	Y-VIO	XDOT	YDOT	ZDOT	EALT	SALT	VALT	C/P	WT	AREA	SRC	APM-TM
17:08:16.452	AER51 -0959	13	1737.60	487.04	1735.88	489.37	-158	+215	-1650.281	+4900	+5725	4000	39	GTI	AKN020-DLG		
17:08:28.503	AER51 -0959	13	1737.06	487.60	1735.75	489.28	-159	+204	-2115.799	+4400	+5226	4000	29	GTI	AKN020-DLG		

MV: 03/08/13	ACID-ACDF	C	X	Y	X-VIO	Y-VIO	XDOT	YDOT	ZDOT	EALT	SALT	VALT	C/P	WT	AREA	SRC	APM-TM
17:09:16.553	AER51 -0959	13	1734.94	490.37	1734.94	490.37	-156	+204	-1949.984	+2900	+3709	3300	CUR	API	DLG19L-L4		

MA: 03/08/13	ACID-ACDF	WT	C	DISP
17:09:16.553	AER51 -0959	API	13	13

MV: 03/08/13	ACID-ACDF	C	X	Y	X-VIO	Y-VIO	XDOT	YDOT	ZDOT	EALT	SALT	VALT	C/P	WT	AREA	SRC	APM-TM
17:09:28.553	AER51 -0959	13	1734.35	490.82	1734.35	490.82	-157	+195	-1959.753	+2500	+3310	3300	CUR	API	DLG19L-L4		
17:09:40.553	AER51 -0959	13	1733.73	491.47	1733.73	491.47	-168	+189	-1923.537	+2200	+2950	3300	CUR	API	DLG19L-L4		
17:09:52.553	AER51 -0959	13	1733.03	491.99	1733.03	491.99	-183	+180	-931.392	+2100	+2850	3300	CUR	API	DLG19L-L4		
17:10:04.553	AER51 -0959	13	1732.49	492.51	1732.49	492.51	-182	+169	-774.597	+2000	+2791	3300	CUR	API	DLG19L-L3		
17:10:16.503	AER51 -0959	13	1731.99	493.12	1731.99	493.12	-174	+164	+0.000	+2100	+2858	3300	CUR	API	DLG19L-L3		
17:10:28.503	AER51 -0959	13	1731.45	493.66	1731.45	493.66	-167	+160	+0.000	+2000	+2809	3300	CUR	API	DLG19L-L3		
17:10:40.553	AER51 -0959	13	1730.91	494.42	1730.91	494.42	-169	+172	+0.000	+2000	+2809	3300	CUR	API	DLG19N-L5		

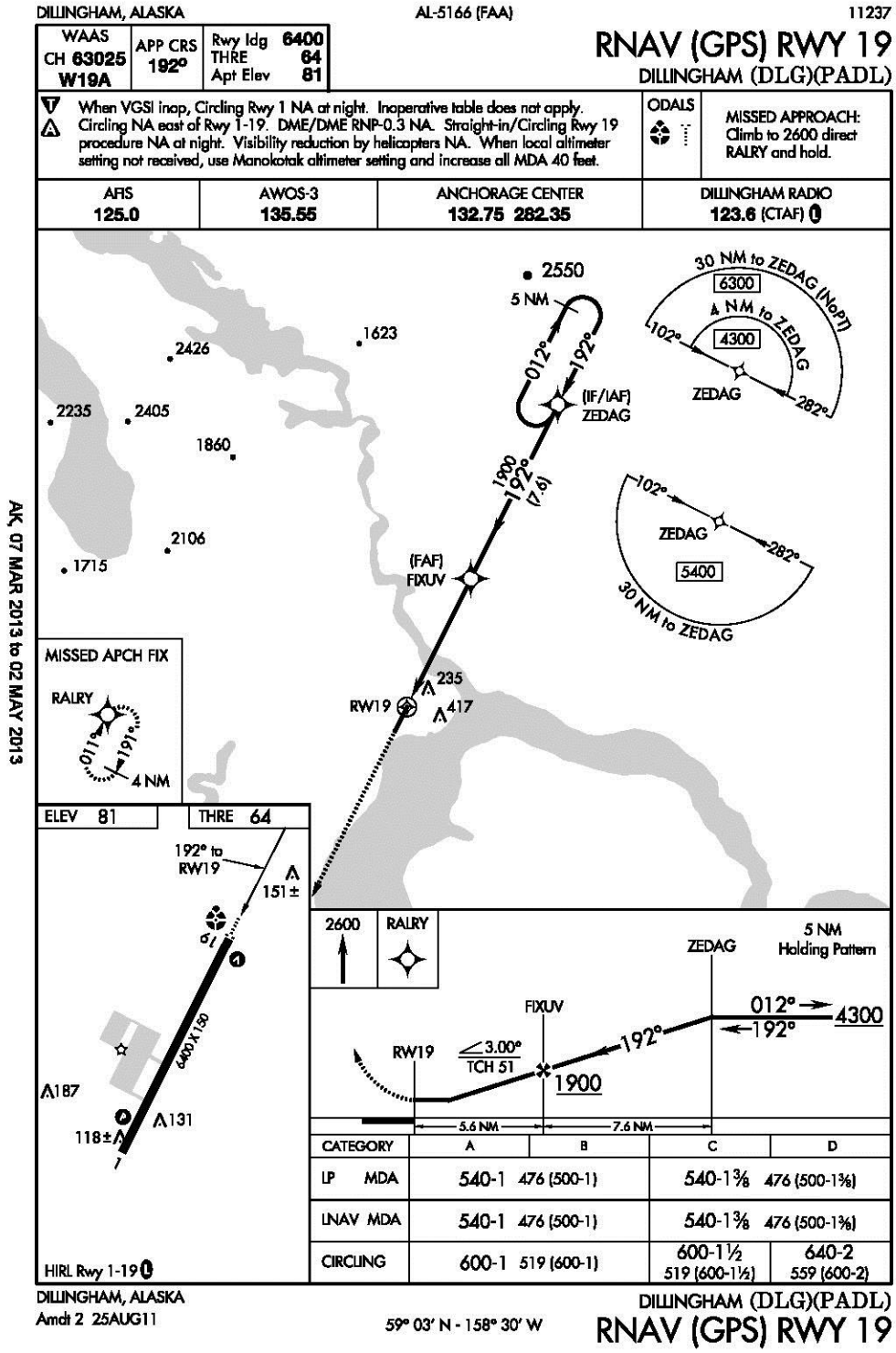

Figure 1 – Dillingham (PADL) GPS runway 19 instrument approach procedure chart.

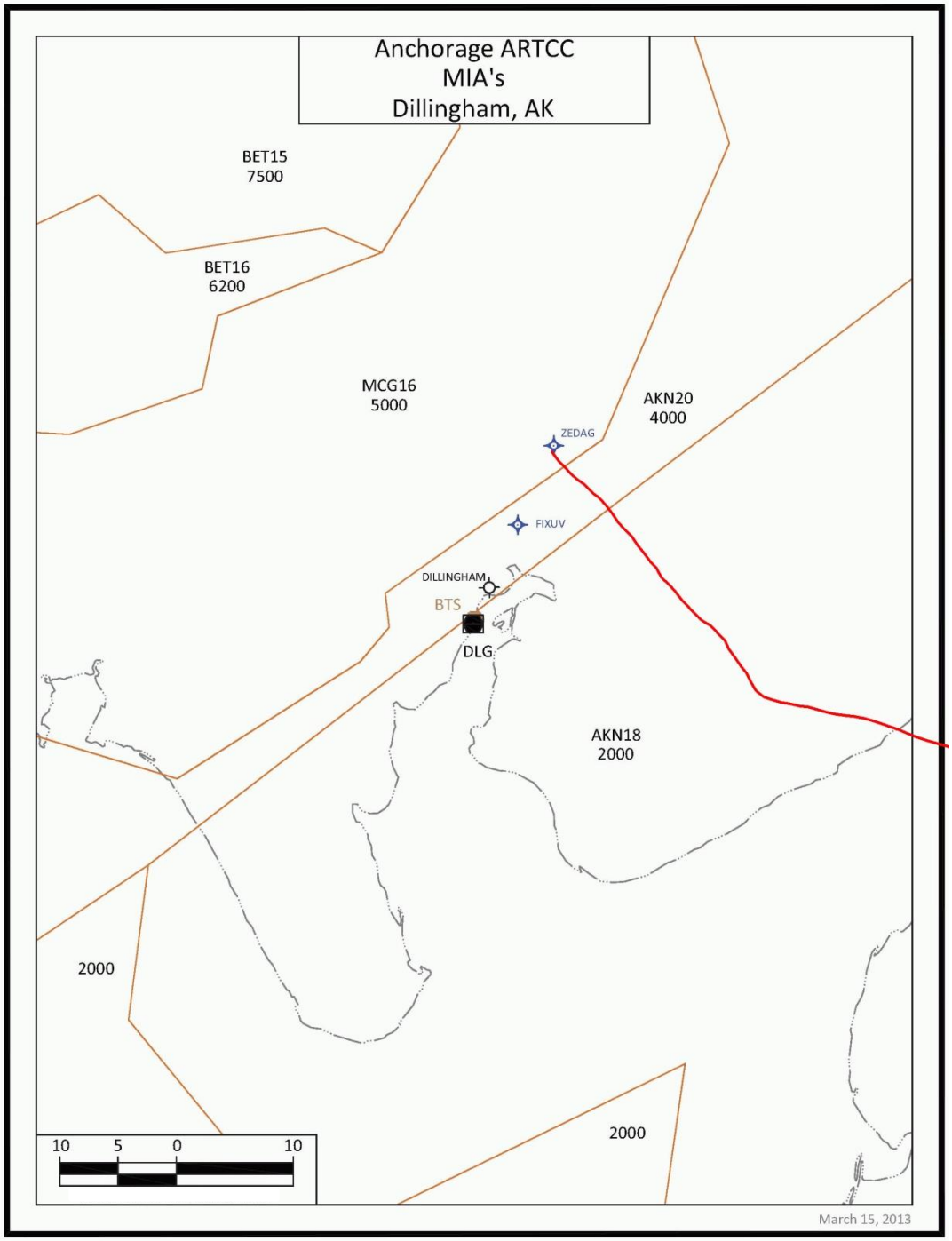

Figure 2 – Dillingham area minimum instrument altitude chart and flight track of AER51.

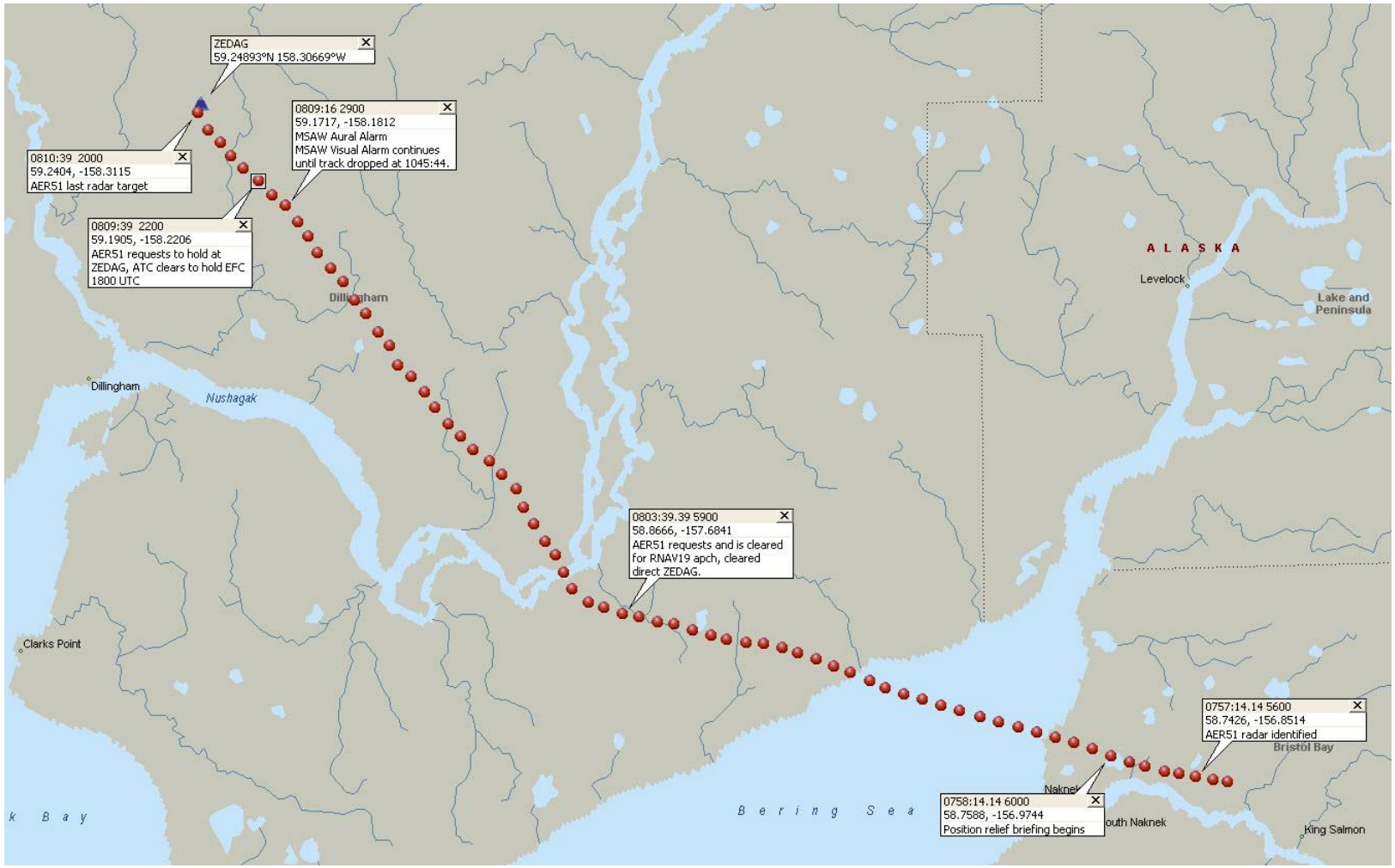

Figure 3 – Overview of targets, times, and altitudes with selected communications.
One-second aural MSAW alert and continuing visual alert began at 0809:16.

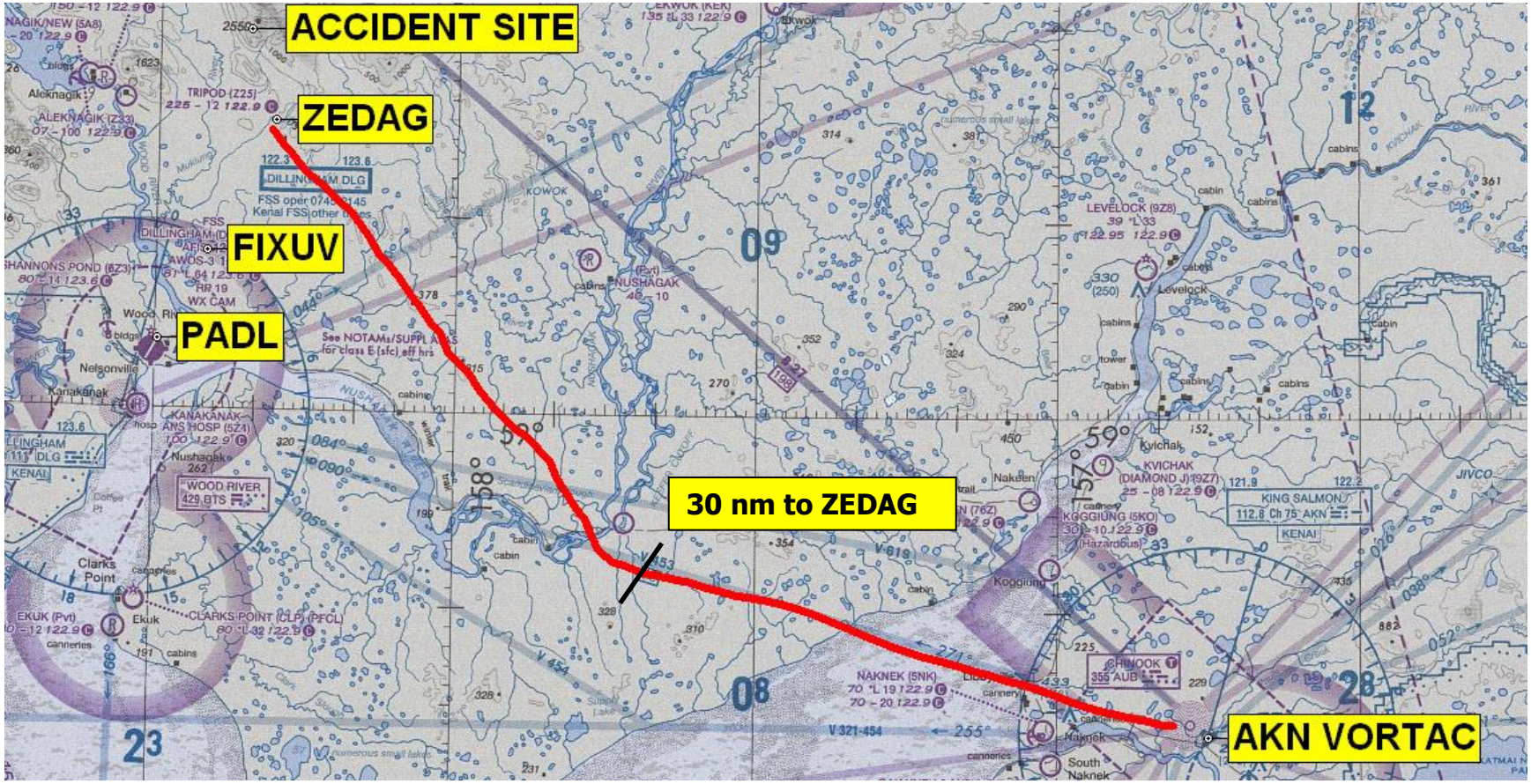

Figure 4 – AER51 ground track (red line) on the Kodiak sectional chart with RNAV GPS 19 approach fixes shown.

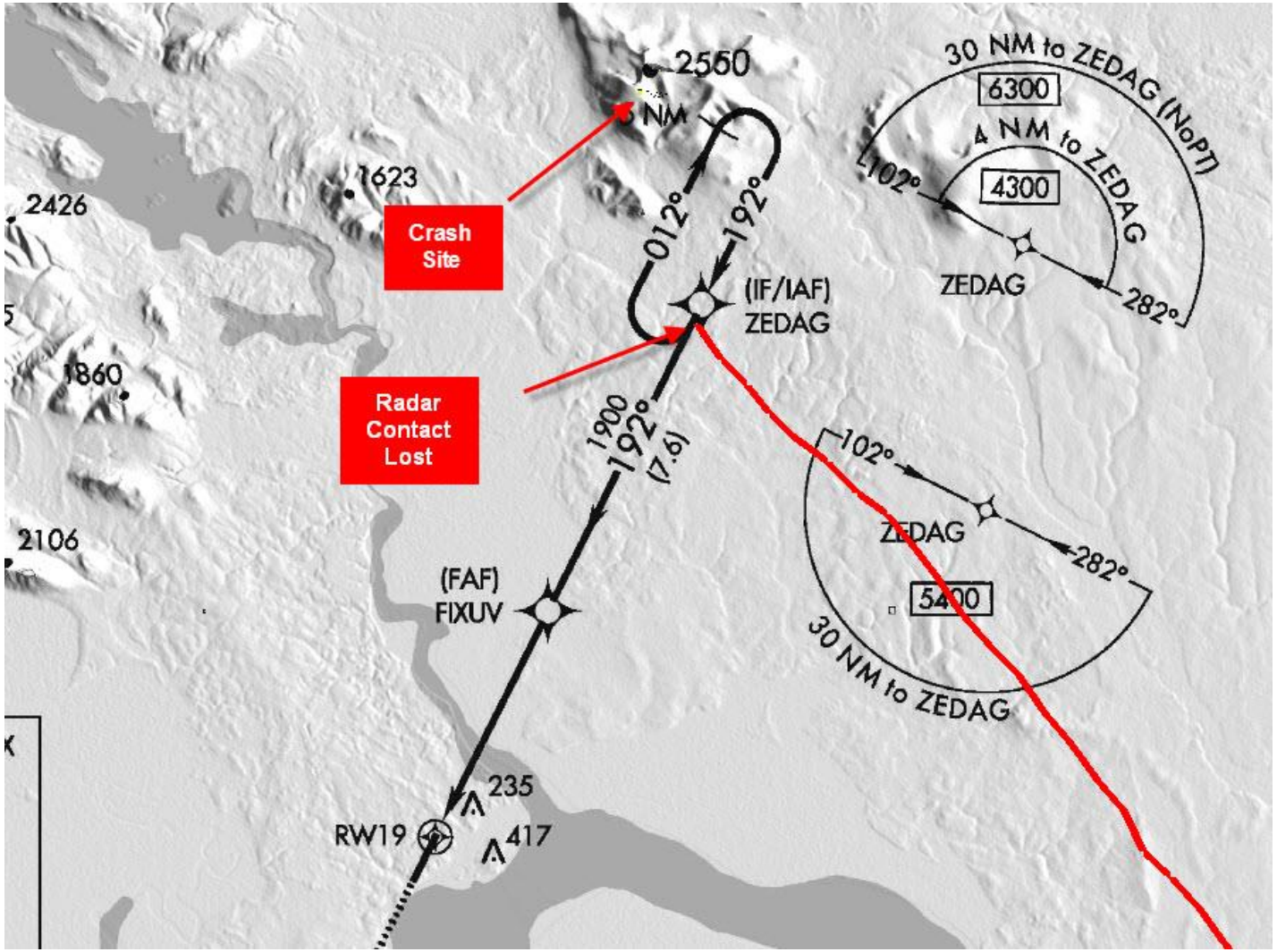

Figure 5 - Red line indicates the flight track of AER51 inbound from King Salmon. The aircraft's last reported altitude was 2,000 feet. The published holding altitude at Zedag was 4,300 feet.

3.0 FAA Post-Accident Actions

Following the accident, ZAN management conducted an internal review of the event, presented a "Lessons Learned" briefing to all operational personnel, and required supervisors to monitor and evaluate controller responses to MSAW alerts and conflict alerts. Documentation of these actions has been included in the docket for this case.

The accident scenario was also briefed to the FAA's "MSAW Board," the technical group responsible for MSAW performance and alerting algorithms, as support for existing FAA recommendation 06-044 on the need for improved alerting methods for MSAW alarms.

4.0 Personnel Interviews

Casey Myers **R3/9/13 Radar Controller**

From 2004 until 2008, Mr. Myers was a United States Air Force radar controller at Laughlin Air Force Base, Texas. Mr. Myers began working for the FAA in February 2009 at the FAA Academy in Oklahoma City. He reported to Anchorage Center in May 2010 and became fully certified in November 2011. His days off were Sunday and Monday, followed by eight hour shifts beginning at 1500, 1300, 1100, 0900, and 0700. On the day of the accident, his shift schedule had been altered to start work at 0700.

Mr. Myers reported no unusual conditions affecting operations on the day of the accident. The supervisor on duty, Mr. Zimmermann, had provided him with a weather briefing including forecast conditions affecting the area. Mr. Myers stated that weather information was provided by supervisors depending on the nature of the conditions. Overall, the facility was fairly consistent in providing weather data to controllers.

Mr. Myers was responsible for clearing AER51 for departure from the King Salmon airport. Before the tower opened at King Salmon, Anchorage Center controllers could speak directly to aircraft on the ground there via radio. Mr. Myers stated that there was nothing unusual about the aircraft's departure, and the flight was radar identified near the King Salmon VOR.

Mr. Myers was asked to explain how he would have handled issuing an approach clearance to AER51 under the circumstances at the time. He said that if the flight was outside the TAA, he would instruct the pilot to maintain 5000 feet until inside the TAA. If the pilot had filed for 4000 feet, the aircraft would have to climb to 4300 feet. The minimum altitude would have to be at or above the minimum instrument altitude (MIA.) Because the aircraft's ground track was in the southeast quadrant from ZEDAG, he would have instructed the pilot to maintain 5000 feet because of the MIAs along the track. If the aircraft had been inside the TAA and above 5400 feet, Mr. Myers said that he could simply clear the aircraft for approach. If necessary, he would refer to the AAID display to review the instrument approach chart. That was normal procedure. He noted that while most pilots fly approach procedures correctly, some do not.

Mr. Myers stated that he had never heard Mr. Wicks issue any unusual clearances, but added that he would say something if he did. Mr. Myers was uncertain how much direct monitoring of control position audio was done by supervisors. They did directly monitor operations, but he was

unable to say how much or how often they did so. As a general observation, he noted that some of the supervisors are more engaged in the operation than others, and some take more corrective actions than others. His expectation was that supervisors should have a general knowledge of operations in the area and at the sectors.

Mr. Myers has seen a replay of the accident sequence. He described it as unfortunate, and something that should have been avoided. In his opinion, the crew was trying to cut corners. Even though they were cleared to maintain at or above 2000 feet, in Mr. Myers's opinion they should have crossed Zedag at 5400 feet coming from King Salmon. His expectation would have been that the aircraft would stay at or above 5400 feet all the way to Zedag. Holding at Zedag was appropriate, and if the aircraft had not descended, there would not have been a problem. He also stated that the crew should have obtained the runway conditions at Dillingham before departure.

Mr. Myers said that if he cleared the aircraft for approach outside the TAA at 5000 feet, he would have expected the pilot to maintain 5000 feet until the TAA boundary, then climb to 5400 feet, complete the course reversal at Zedag, and land. If the aircraft was already inside the TAA, Mr. Myers would clear the aircraft for approach and then expect the pilot to climb to 5400 feet automatically. The aircraft should then continue to Zedag at 5400 feet and complete the remainder of the approach. Mr. Myers stated that he has previously seen aircraft climb to the TAA altitude without specific clearance to do so. Regarding the aircraft's route, Mr. Myers stated that he did not think the pilots ever intended to hold, but instead were expecting to just go straight in to land.

Asked what controllers think about MSAW alerts, Mr. Myers stated that the system generates frequent warnings, and many of them are invalid. He stated that he had submitted a report of 5 alarms that were not valid. In those instances the aircraft were on a visual approach with the "visual" entry put in.

Mr. Myers described the facility training program as "a little slow," but said that the instructors were generally good and had a lot of knowledge. Testing during training was generally closed book. He noted that changes to instrument approach procedure charting were typically discussed at crew briefings.

Mr. Myers was asked whether a pilot who had been instructed to maintain at or above 2000 feet, but read back maintain 2000 feet, would have read the clearance back correctly. He said that it would be a correct readback. Asked how he would expect a pilot to respond if the pilot was cleared direct to Zedag and then the "Zedag transition," Mr. Myers said that he would expect the pilot to enter holding at Zedag, reverse course and then continue the approach.

Asked about the specific phraseology, "maintain <altitude> until established on a published segment of the approach," Mr. Myers stated that it was taught during on-the-job training. When issuing approach clearances, Mr. Myers stated that he might or might not use a second radar display zoomed in on the area of the approach to monitor the aircraft. MIA information can be displayed on the radar scope, but his personal preference set has the information turned off. It could be turned on if needed.

Mr. Myers stated that the volume on the MSAW aural alarm was adjustable. It was quite common to hear aural alarms in the control room. Asked to describe the circumstances under which nuisance MSAW alarms occur, Mr. Myers stated that aircraft conducting visual approaches frequently cause MSAW alerts.

Mr. Myers stated that the information display system at the sector was located quite far to the right of the radar display when the sectors were combined. He was using the display on the day of the accident, and noted that it cannot be pulled closer to the radar position. Sometimes it was necessary to roll back and forth to read the information display. Even so, he could usually see it pretty well.

Asked about the terminology for holding "as published," Mr. Myers stated that he believed the pilots should have automatically climbed to 4300 feet, the altitude shown for holding on the instrument approach procedure chart, without specific instruction to do so.

Daniel Brady **Operations Manager, North Area**

Mr. Brady began working for the FAA on February 17, 1988, attending the FAA Academy in Oklahoma City. He reported to Fairbanks Tower in May of 1988, and came to Anchorage Center in March of 2008 as a front-line manager. In December 2012, Mr. Brady was detailed to an operations manager position.

Mr. Brady was called at home to report to work about two hours after the loss of contact with the accident aircraft. When he arrived at the facility, he went to the operations manager desk to find out what was needed. The on-duty operations manager asked Mr. Brady to handle the post-accident activities that needed to be completed. Mr. Brady ensured that the data about the accident was properly reviewed, and acted as a liaison between the quality assurance department and the North area staff involved in the accident. He ensured that the involved employees were prepared to be interviewed about the events, and that they were also aware of the critical incident stress debriefing program and the employee assistance program.

About 1000, Mr. Brady was at the operations manager desk and heard that the aircraft wreckage had been located. That information turned out to be incorrect, with the wreckage not actually being confirmed found until several hours later. However, Mr. Brady had no way to know that the information was incorrect, so he did not work on search and rescue issues because there was apparently no need to do so. He noted that despite the incorrect report, the search and rescue teams had continued to work. He continued assisting the quality assurance department, NATCA, and the front-line manager in the area, ensuring that everyone could listen to the audio recordings of the accident and review the radar replay.

Mr. Brady had reviewed a replay of the accident since it occurred. He was concerned about the apparent low altitude of the accident aircraft. He had heard the approach clearance, and described it as, "not good." He had heard similar phraseology used before in other circumstances but not in conjunction with this particular approach procedure. Specifically asked about the phraseology,

"until established on a published segment of the approach," Mr. Brady stated that this was incorrect and that the clearance should have prescribed a safe altitude until entering the TAA or included a crossing restriction at Zedag. He stated that he could prove via reference to FAA directives that a controller could not issue an altitude below the TAA in this type of clearance. He believed that the training department did teach the correct method of issuing approach clearances. He was not aware of any specific ZAN refresher training on RNAV GPS approaches.

Mr. Brady's practice when supervising the area was to react to MSAW alarms by going to the sector to determine the cause. He stated that when aircraft were conducting visual approaches, controllers needed to make a specific computer entry about that to reduce the likelihood of MSAW alerts. The aural alarm sound for a conflict alert and the sound for MSAW alerts were similar, and frequently sounded in the control room.

Mr. Brady stated that performance management was accomplished by monitoring positions, engaging in discussions with controllers, and creating performance records of conversation to document both good and undesirable performance. All mandatory occurrence reports generated by the facility were addressed through performance records of conversation. Supervisors have an informal objective of performing one performance record of conversation discussion with each employee every six months. Recently, supervisors have been exceeding that standard. Internal compliance verification audits were also conducted by the facility, typically about five times a month covering various topics. The process of performance review is more or less continuous. Supervisors do monitor controllers and issue on the spot corrections as necessary.

Shown a memorandum from the facility manager about use of unapproved minimum instrument altitudes, Mr. Brady explained that some controllers had interpreted the language in the air traffic control handbook as permitting them to essentially create their own MIAs by referring to sectional charts or other geographic data sources. It was out of the ordinary, not a common practice, and mostly occurred during exigent circumstances. Some controllers were directly counseled about the practice and instructed to comply with the procedures contained in the memo. They were also advised of appropriate methods for challenging the procedure if they disagreed with it.

Asked if he knew of any issues with controllers not responding to MSAW alerts, Mr. Brady stated that some controllers believed every MSAW alert required that a safety alert be issued. In his opinion, the requirement was that each alert must be evaluated and responded to appropriately. Not all MSAW alerts require a safety alert, but instead must be evaluated to identify an appropriate response. Some aircraft operating under VFR-on-top clearances flew below the minimum instrument altitude, causing MSAW alerts to controllers. The facility instruction was to issue low altitude warnings to such aircraft. Some controllers also issued altitude restrictions, directing pilots to maintain at or above the minimum instrument altitude. Controller-reported issues with the MSAW system were forwarded to the automation staff, who then corrected the reported problems if possible. Answers about such issues were returned to the submitter.

Mr. Brady stated that he has conducted performance record of conversation discussions with Mr. Wicks, but did not recall the specific content. His assessment was that Mr. Wicks was a good

employee. Mr. Brady also noted that he had conducted some or all of Mr. Wicks's radar certification checks.

Mr. Brady stated that the facility does not file as many pilot deviation reports as they did before revision of the quality assurance and quality control orders. Controllers were no longer responsible for informing management of events such as pilot deviations. In the event of major transgressions that affected either another aircraft or overall safety, they could submit a report to the ATSAP program instead.

Mr. Brady stated that the last internal compliance review he recalled involved incomplete coordination about release and return of surface areas. There had been some miscoordination about the status of these areas, and the facility conducted a review with the intent of improving the situation.

Mr. Brady was asked how the Western Service Area staff monitored Anchorage Center actions regarding quality control. He said that internal audits may identify problems, but there was not a lot of additional monitoring of Anchorage Center operations using external data access tools. Asked if the AER51 pilot's read back of "maintain 2000 feet" in response to an instruction to "maintain at or above 2000 feet" was an acceptable read back, Mr. Brady said that if the altitude the pilot read back was acceptable to him he would take the read back as given.

Buck Wicks **R3/9/13 Controller**

Mr. Wicks began working for the FAA on April 10, 2008, at the FAA Academy in Oklahoma City. He reported to Anchorage Center on June 24, 2008. At the time of the accident he was working the radar position for sectors 3, 9, and 13 combined. His normal workweek consisted of Sunday and Monday off, followed by five eight-hour shifts, beginning at 1500, 1300, 0900, 0800, and 0600. The accident occurred on his fourth day at work, and he had traded into a 0530 shift that day.

Mr. Wicks worked a day shift on the day before the accident, and reported going to bed about 2200. He woke up at about 0430, getting about 6 1/2 hours sleep. He said that this was about his normal amount of sleep, and that he felt all right with no unusual conditions that affected his performance. Operations in the control room were normal, with no particular distractions or equipment issues. There were no other unusual conditions that were a factor in the event.

Mr. Wicks stated that he began working at the sector along with the second early day shift controller at 0530. He continued working the radar associate position until 0700. He then took a break for approximately one hour, and returned to the control room to relieve Casey Myers at 0800. Mr. Myers provided a relief briefing that contained a little more information on forecast weather than normal. Mr. Wicks was unaware of any current pilot reports related to either icing or wind shear. Mr. Wicks was uncertain where Mr. Myers had received the weather information, but noted that it was not normal for a briefing to contain forecast weather. There was not a lot of traffic in the sector, perhaps five aircraft. The workload was normal for that time of the morning, with a few coordination calls to make, etc. Mr. Wicks did not feel like he was getting behind or trying to catch up with anything. When he took over the position, he noted that AER51 was

“pretty close to Dillingham,” needed to be set up for the approach, and would require a coordination call to Dillingham flight service. The aircraft had already been switched to the correct ZAN frequency for the Dillingham area.

Mr. Wicks asked the pilot which approach he wanted to fly. The pilot responded that he was checking the weather conditions. About 1 minute later, the pilot requested to fly direct to Zedag for the RNAV runway 19 approach. Mr. Wicks cleared the pilot to proceed direct to Zedag, Zedag transition, and to maintain at or above 2000 feet until established on a published segment of the approach. Based on that clearance, Mr. Wicks stated that he expected the aircraft to proceed direct to Zedag, execute a course reversal in a holding pattern and then continue the approach and land. The 2000 foot restriction based on a quick reference to the MIA chart for the aircraft’s current position, was issued to protect for the minimum IFR altitude at the aircraft's position at the time of the clearance, and was expected to be in effect until the aircraft was established on a published segment of the approach. That would occur when the aircraft entered the TAA. Mr. Wicks said that he did not expect the aircraft to descend below 5400 feet, and did not notice when the pilot did so. He also did not notice the aircraft's actual altitude when the pilot requested holding at Zedag. Mr. Wicks said that at the time he was in front of the strip board looking for information on inbound aircraft. He looked at the approach plate for the RNAV 19 approach, and issued the requested holding clearance. He was writing the clearance down as the pilot was reading it back.

At the aircraft approached Zedag, recorded radar data showed that an MSAW alert activated for the flight. Mr. Wicks stated that he was not consciously aware that the MSAW alert was going off, and therefore did not have any immediate concern that the aircraft was producing an alert. He noted that either a recurring aural alarm or relaying the aural alarm into his headset might have helped him notice the alert. Mr. Wicks stated that he did not recall receiving any specific training on MIA polygons or MSAW processing. Because the aircraft was entering an area where the MIA was 5000 feet, Mr. Wicks would have expected to see an MSAW alert if the aircraft had been at 4300 feet. He was unaware of the particular adaptation information for that area. He said that he had never submitted a report of nuisance alarms caused by the MSAW system. However, another controller in the area had been tracking MSAW alerts for a while. Mr. Wicks stated that nothing happened following submission of such reports, so he did not bother to turn them in.

Asked how he would handle an aircraft on the same route but cruising at 4000 feet, Mr. Wicks stated that he would instruct the pilot to climb to 5000 feet, and then instruct him to cross Zedag at 5000. However, his understanding was that if issued an approach clearance, the pilot would have to climb to 5400 feet on his own to comply with the published altitudes on the approach.

Mr. Wicks initially instructed the pilot to maintain at or above 2000 feet, but the pilot read back to descend to 2000 feet. Mr. Wicks said that he did not expect the pilot to actually descend to 2000 feet. He was trying to account for the fact that the aircraft was not yet inside the TAA and that he needed to protect for the 2000 foot MIA at the aircraft’s current position until the aircraft did become established on the approach. Mr. Wicks stated that informing the pilot of his position in reference to the initial approach fix was not required.

In reference to the specific phraseology Mr. Wicks used in issuing the approach clearance, “maintain at or above 2000 until established on a published segment of the approach," he stated that he uses that phraseology only for RNAV/GPS TAA operations. Asked what altitude he expected the pilot to hold at when instructed to hold as published, Mr. Wicks said that he would have expected the pilot to climb to 4300 feet as shown in the profile view of the approach. He said that his normal practice would be to enter the assigned altitude in the aircraft’s data block, but he did not specifically recall what he did with AER51.

Mr. Wicks said that he did not advise the pilot of AER51 when radar contact was lost because he was not aware of that until Dillingham flight service called a few minutes later. There had been no indication that anything was wrong, with no queries from the pilot about altitude or holding or other problems.

Mr. Wicks said that he had not only looked at the approach plate when the pilot requested holding, he had also reviewed it earlier as part of his preparation for the approach. When he cleared the pilot direct to Zedag and then the Zedag transition, his thinking was that 2000 feet was adequate until the aircraft entered the TAA to protect for the MIA in the immediate area.

When working combined sectors as he was at the time of the accident, Mr. Wicks stated that he usually spends time nearer to the flight strips and the information display to the side of the radar scope. This was somewhat of an ergonomic issue. The information display was not mounted on an articulating arm, so it could not be moved closer to the radar display. Mr. Wicks was uncertain whether the text size on the display could be changed. Asked if he had ever seen a controller issue an approach clearance without referring to the approach plate in the AADS, Mr. Wicks said that he had seen that done.

Mr. Wicks stated that aircraft on visual approaches will almost always cause an MSAW alert. It is sometimes not possible to issue a safety alert to those aircraft because they have been transferred to the common traffic advisory frequency and the Center was unable to communicate with them. The frequent MSAW nuisance alarms conditioned controllers to not be as attentive as they otherwise would be. There had been recent change in the sound system for the MSAW alert, and right after the change the volume was "blaring." It has been reduced to the level that it was formerly set at before the sound system modification. In reference to the .V keyboard entry function available to controllers for aircraft on visual approaches, Mr. Wicks said that it did not suppress MSAW functionality, or at least if it was supposed to, it wasn't working. The North area had many airports with numerous instrument approaches.

Mr. Wicks said that he would not be reluctant to issue an approach clearance to a professional pilot that was operating below the TAA altitudes. His expectation regarding pilot proficiency was that N-number (general aviation) pilots would be less proficient than professional pilots.

Mr. Wicks was uncertain whether the simulation training at the Center included a specific class on RNAV approaches, or specific instruction on TAAs. He believed that his simulator training had transferred well to the operational environment, and his level of knowledge was approximately what his on-the-job training instructor expected. The facility instructors with previous controller experience were good, but the others were not as good. The majority of the

testing during lab and classroom training was open book, but there were three closed-book exams.

Around the time of the accident, the supervisor was in and out of the area, and was not gone for any extended periods.

The group had received some comments about controllers creating their own MIAs by referring to the sectional charts in the area. Mr. Wicks said that the practice was predominantly conducted by one controller who had since retired, and that it was not a common practice in the area.

Mr. Wicks said that to become certified as an on-the-job training instructor, controllers received classroom instruction on instructional techniques, followed by one live session of on-the-job training supervised by a front-line manager. Providing on-the-job training was considered part of a controller's job, and the average controller also served as an instructor unless there was some reason for them not to provide training.

Mr. Wicks said that it was uncommon to see a pilot not comply with the requirements of an instrument approach procedure, and he was not aware of any operators that routinely disregarded the procedures. The normal RNAV approach in the area was a "T" configuration and was normally flown in the standard way.

Asked if he believed that there should be a radar associate controller assigned whenever the sectors were combined, Mr. Wicks said that it would not hurt anything, but it was not necessary.

Paul McEwen **Operations Manager - South Area**

Mr. McEwen began working for the FAA on June 24, 1988 at the FAA Academy in Oklahoma City. He reported to Anchorage Center in September of 1988, and transferred to New York Center in July of 1995. He returned to Anchorage in September 2008 as a front-line manager, and was detailed to a temporary operations manager position in October of 2011.

Mr. McEwen was the operations manager on duty at the time of the accident. Other than the clarification of some weather information that he had received from the center weather service unit, he noted no unusual conditions affecting the operation. He found out about the accident about 0830 when Mr. Zimmerman came to him from the North area to report that there was a possible problem involving a missing aircraft near Dillingham. Mr. McEwen notified the Rescue Coordination Center (RCC), the quality control manager, and the air traffic manager. An alert notice about the missing aircraft was issued about three minutes later. Mr. McEwen asked the quality assurance manager to obtain radar data on the aircraft, and called operations manager Dan Brady at home to ask him to come in and assist. The quality control manager was mainly handling the accident details while Mr. McEwen was taking phone calls and handling facility coordination. About an hour after the original alert notice was issued, Mr. McEwen realized that the fix name Zedag had been spelled incorrectly. The flight data section canceled the original alert notice and reissued a new alert notice with the correct spelling.

After about an hour, Mr. McEwen was supplied with the location of the last radar target for the aircraft and passed the coordinates to the RCC at about 0940. Mr. Brady arrived about that time and began helping the quality control manager with the accident followup. Mr. McEwen noted that obtaining radar data within about an hour is fast for Anchorage. Ninety minutes up to as much as three hours is more typical. He was working to get the coordinates of the aircraft's last known position to the RCC as soon as possible.

As soon as he could, he listened to the audio recording of the clearance issued to the aircraft. He did not see a radar replay of the event until about a week before this interview. About 1010, the FAA regional operations center notified Mr. McEwen that, according to the RCC, the aircraft wreckage had been located. Based on that report, Mr. McEwen canceled the alert notice on the aircraft.

When acting as operations manager, it was Mr. McEwen's practice to walk through the operations room two to three times an hour to observe conditions. He walked through the North area about 0800 and saw both controllers working as normal, with no unusual conditions.

The facility had access to the Falcon radar replay program, which could be used to review data from the area surrounding the Anchorage airport. Mr. McEwen was confident that he could use that system as necessary to locate aircraft within its area of coverage. He noted that not all of the supervisors have had training on Falcon or access to the system, and he was not certain whether controllers or others have access or training either. The facility also has access to CDR Player Plus software in the building as well as CountOps data by request to Anchorage approach control. Both programs may be used to locate aircraft under certain conditions. It could take up to two hours to create a replay of MicroEARTS radar data under normal procedures, so there was no standard use of replays for training purposes.

When Mr. McEwen reviewed the audio recording of the clearance issued to the accident aircraft, he did not have radar data to compare it to. The phraseology used by the controller to instruct the pilot to maintain an altitude "until established on a published segment of the approach" has been used here "forever." Asked about the reported use of unofficial MIA information at the Center, Mr. McEwen stated that to his knowledge that had never been the case in the South area, only in the North area, and had since been corrected. He also noted that the professional standards program addressed issues of various types, and because of that program he was not necessarily made aware of all events. He personally liked the program, but noted that some of the front-line managers did not.

Under the new QA/QC orders, supervisors typically use performance record of conversation discussions for performance management. If necessary, a collection of those discussions could be assembled and submitted to the event review committee in support of training requests. The operations managers and quality control department did operational skill assessments many times a month, and the supervisors also provided on the spot corrections when necessary. Mr. McEwen stated that he did not personally receive any electronic information on performance, but the quality control manager might receive such information. The quality control department typically supplied operations managers with the national top five list of concerns, as well as results of internal compliance verification audits. The operations managers reviewed all

mandatory occurrence reports, and such reports were the subject of performance record of conversation discussions with controllers. Performance conversations must be conducted by the employee's supervisor of record. Mr. McEwen noted that there was still a lot of confusion about the new QA/QC process. He could not recall specifics, but stated that he had been notified of issues that were passed to him for correction.

Mr. McEwen participated in the safety committee until approximately September 2011. The safety committee solicited reports from facility staff on safety issues and had an input form for the purpose. When reports were received they were reviewed by the committee, discussed, and forwarded to the air traffic manager for action. The phraseology used in this clearance regarding a published segment of the approach had not been addressed as a performance issue because it was considered normal by the facility.

Mr. McEwen stated that he would not personally issue an approach clearance to an aircraft operating below the TAA altitude, but would instead instruct the pilot to climb to an altitude at or above the TAA minimum. He would not expect the pilot to climb on his own. Mr. McEwen said that all MSAW alerts should be evaluated and a safety alert issued if warranted.

Asked about suspension of operations after the accident, Mr. McEwen noted that the controller had only suspended operations at the airport following the crash based on the aircraft's original ETA to the airport. Instead, he probably should have relied on the "expect further clearance" time issued to the pilot which would have restricted operations longer.

Asked about the position's physical layout and combining of sectors 3, 9, and 13 at one position, Mr. McEwen stated that the position layout was not so bad for the volume of traffic.

Buck Zimmerman **North Area Front Line Manager**

Mr. Zimmerman began working for the Federal Aviation Administration on May 11, 1997, at Livermore tower in California. In 1998, he transferred to Juneau tower, and came to Anchorage Center in September of 2003. He became a front-line manager on August 17, 2008.

On the day of the accident, Mr. Zimmerman was working a 0700 shift. There were no unusual issues, except for a technical operations request for a frequency check on the Dutch Harbor transmitter. The normal practice in the North area was to open up sectors 3/9/13 at 0700, combined and staffed by a single controller. Just before the accident, Mr. Zimmerman was delivering a pilot report to the flight data section. When he came back to the supervisor's desk, he found a new weather product that had been delivered by the weather service unit. There was some confusion over its currency, so he left the area again and went to the center weather service unit to validate the report. He then returned to the area and was working at the supervisor desk when he heard Mr. Wicks calling AER51, then having another aircraft call AER51 as well. He became concerned because of Mr. Wicks's tone, so he went to the sector to see if there was a problem. Mr. Wicks advised him that AER51 was not responding and that he had lost communications while the aircraft was holding. Mr. Zimmerman stated that he thought Mr. Wicks had not scoped up and zoomed in when the clearance was issued.

Mr. Zimmerman contacted AER operations via telephone to see if they were in contact with the flight. The operations person advised that they were not. At that point Mr. Zimmerman realized that there may have been a serious situation and went to the operations manager to suggest that they immediately issue an alert notice. He provided the information on the aircraft to Mr. McEwen so that he could notify the Domestic Events Network, and then took the information needed for the alert notice to the flight data section.

He then returned to the area and spoke with Mr. Wicks to see if the aircraft had been found. He also assigned another controller to assist Mr. Wicks by working the radar associate position, and then called Mr. Myers back to the area to relieve Mr. Wicks from the sector. Because it was likely that Mr. Wicks would be unable to work for the remainder of the shift, Mr. Zimmerman realized he would need to contact another controller to work overtime. He began to work on that, and sent Mr. Wicks to the operations manager desk. The operations manager advised Mr. Wicks to take a break and wait to be contacted.

Mr. Brady later arrived in the area, and was briefed by Mr. Zimmerman on what had occurred. Mr. Zimmerman was then also relieved from his duties in the area. He reviewed the recording of the event about 1330, and although the radar data had been requested, the replay was not yet available. When the replay became available, Mr. Zimmerman reviewed it as well. His assessment was that the aircraft had been too low, and said that he was "shocked" that there had been no response to the MSAW alert. Mr. Zimmerman did not discuss the accident with Mr. Wicks directly, but was in the room with the quality control manager when Mr. Wicks provided a statement about the event. Mr. Zimmerman did subsequently have a performance record of conversation with Mr. Wicks which addressed altitude information, minimum altitudes along off-airway routes, clearance readbacks, duty priority, and safety alerts. His assessment was that this was a very unusual operation for Mr. Wicks. He was normally a very competent controller, with no problems or performance issues. He had no history of similar events. As part of the post-accident investigation, Mr. Zimmerman reviewed all of his control sessions for the previous two weeks and found no questionable clearances. Mr. Zimmerman also spoke with his previous supervisor, Bob Berry, who reported no issues or unusual problems.

Mr. Zimmerman believed that this was a bad clearance, but noted that the minimum altitude between the King Salmon VOR and the Dillingham VOR was 2000 feet, and thought perhaps Mr. Wicks missed the MIA violation because he believed the aircraft was all right at 2000 feet. He also thought that perhaps Mr. Wicks had come back from his break groggy and simply not up to speed, but Mr. Wicks did not make any statement about having slept during the break or being sleepy.

Mr. Zimmerman's expectation for how a controller would handle an aircraft on this approach was that the controller would either climb the aircraft to operate at or above the TAA minimum, or instruct the pilot to cross Zedag at 5000 feet. The controller would be required to protect the minimum instrument altitude along the aircraft’s route of flight.

Asked if the facility had provided any specific training on RNAV/ GPS approaches, Mr. Zimmerman said the last training he recalled probably occurred around 2007. The phraseology

about “published segment of the approach” used by Mr. Wicks had been prevalent at Anchorage for a long time. When Mr. Zimmerman reviewed Mr. Wicks’s previous work, he noted that it was Mr. Wick’s practice to generally wait until the arrival aircraft was within the TAA before issuing an approach clearance. He only heard Mr. Wicks use the “published segment of an approach” phraseology twice during a two-week review of his work. The two-week review was also validated by another supervisor who concurred with Mr. Zimmerman's assessment.

Post-accident drug testing had been conducted later that night after the accident because the tester needed to come from Sitka to perform the test. Once the test was completed, Mr. Wicks was given administrative leave for the remainder of the night.

Asked about the use of unapproved MIA information by controllers, Mr. Zimmerman stated that he first became aware of the practice when he became a front-line manager and reported it to the training department. The issue was addressed at that time, and Mr. Zimmerman believes that it is no longer used in the area.

Mr. Zimmerman reported that he did not observe any conversation between Mr. Wicks and the other controller in the area. He stated that it was very quiet in the area, and that Mr. Wicks and the other controllers on his team were generally quiet people. When Mr. Zimmerman discussed the accident with Mr. Wicks, Mr. Wicks stated that he did not hear the aural alarm for the MSAW alert and did not notice the flashing warning in the data block. He noted that the aural alarm occurred almost concurrently with a phone call, and the phone call may have masked the aural alarm to some extent.

Mr. Zimmerman has only been Mr. Wicks’s supervisor since January and was uncertain whether he had conducted any performance conversations with Mr. Wicks since then. He thought perhaps one, but was uncertain.

Asked about MSAW nuisance alarms, Mr. Zimmerman stated that there had been some reports in the past which were referred to the automation department. Some of the situations were corrected or minimized. Mr. Zimmerman doesn't personally think that the MSAW alerts are nuisances, stating that most were valid. He explained that the .V keyboard entry changed the MSAW parameters to better accommodate aircraft on visual approaches.

Controllers typically referred to the AAID to review approach plates. The way the display was configured, the entire approach plate was not visible at one time. Controllers could only look at the top half or scroll down to the bottom half.

Mr. Zimmerman stated that he had never seen an aircraft climb after being issued an approach clearance, but there was a training scenario where the pilot would have to climb to meet minimum altitudes. It was somewhat of a gray area, and it is unclear exactly how controller should issue such clearances.

Regarding the new QA/QC process, Mr. Zimmerman stated that Anchorage was one of the first facilities to be briefed on the new program. The main activity of the program at Anchorage involved the quality control operational skills assessment process, as well as performance

records of conversation conducted with controllers by supervisors. Tape monitors could be done, but they were not attributed to a specific controller. The performance record of conversation was the only tool available to front-line managers for performance management.